

CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

What is claimed is:

1. (Currently Amended) An actuation assembly for moving in unison a plurality of aerodynamic vanes disposed within a variable geometry turbocharger that includes an actuator coupled to a ~~movable~~ moving unison ring, the unison ring being disposed within a turbocharger turbine housing and attached to the plurality of aerodynamic vanes, ~~the actuation assembly~~ actuator comprising a crank arm rotatably disposed within the turbine housing and attached at a first end to the actuator and to a second end to the unison ring, wherein the crank arm second end includes a first gear member comprising teeth, and the unison ring includes a second gear member comprising teeth, wherein the teeth of the first and second gear members are cooperatively engaged with one another, and wherein the second gear ~~assembly~~ member is ~~movably~~ coupled to the unison ring by cooperative surface features to permit unison ring thermal expansion and contraction movement during turbocharger operation while maintaining engagement between the first and second gear members.

2. (Canceled)

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3. (Original) The actuation assembly as recited in claim 1 wherein the first gear member is a pinion gear and the second gear member is a rack gear.

4. (Cancel)

5. (Currently Amended) The actuation assembly as recited in claim 4 1 wherein the cooperative surface features comprise a tongue that cooperates within an opening, and wherein the tongue and opening are sized to permit thermal expansion and contraction movement between the unison ring and rack gear.

6. (Previously Presented) The actuation assembly as recited in claim 5 wherein the tongue projects outwardly from the unison ring, and the opening is disposed within a surface of the rack gear.

7. (Currently Amended) A turbocharger assembly comprising:

a turbine housing;

a turbine wheel carried within the turbine housing and attached to a shaft;

a plurality of vanes pivotably disposed within the turbine housing;

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a moving unison ring attached to the plurality of vanes to move the vanes in unison with one another, the unison ring including a first gear member having teeth attached thereto;

a crank arm disposed within the turbine for moving the unison ring, the crank arm including a second gear member at one of its ends and having teeth that are engaged with the teeth of the first gear member; and

means for maintaining engagement between the first and second gear members during operation of the turbocharger, the means being ~~an attachment mechanism~~ cooperative surface features between the unison ring and the first gear member.

8. (Original) The turbocharger assembly as recited in claim 7 wherein the first gear member is a rack gear and the second gear member is a pinion gear.

9. (Canceled)

10. (Canceled)

11. (Currently Amended) The turbocharger assembly as recited in claim 9 wherein the cooperative ~~attachment surface features~~ comprises comprise a tongue that projects from one of the unison ring and rack gear, into an opening of the other of the unison ring and rack gear.

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12. (Currently Amended) A turbocharger assembly comprising:

a turbine housing;

a turbine wheel carried within the turbine housing and attached to a shaft;

a plurality of vanes pivotably disposed within the turbine housing;

a moving unison ring attached to the plurality of vanes to move the vanes in unison with one another, the unison ring including a rack gear having teeth attached thereto;

a crank arm disposed within the turbine for affecting movement of the unison ring, the crank arm including a pinion gear at one of its ends that has teeth that are engaged with the teeth of the rack gear;

wherein the rack gear ~~rack~~ is ~~movably~~ attached to the unison ring by cooperative surface features to permit a ~~predetermined degree of~~ unison ring thermal movement during turbocharger operation while maintaining a ~~desired~~ tolerance between the pinion gear and rack gear.

13. (Currently Amended) A method for actuating a plurality of movable aerodynamic vanes within a variable geometry turbocharger, the method comprising the step of rotating a crank arm that is disposed within a turbine housing of the turbocharger, the crank arm having a first gear member attached at one of its ends that is engaged with a second gear member

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movably that is attached to a moving unison ring by cooperative surface features, the unison ring being disposed within the turbocharger, wherein the step of rotating the crank arm causes the unison ring to be rotated by the engagement of the first and second gear members, and wherein the unison ring is coupled to the plurality of aerodynamic vanes to move the vanes in unison.

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